1115-81-133 **Timothy Nguyen*** (timothyn@math.msu.edu), 2420 Burnt Tree Lane, Apt 8, East Lansing, MI 48823. *Quantum Yang-Mills Theory in Two Dimensions: Exact versus Perturbative.*

The standard Feynman diagrammatic approach to quantum field theories assumes that perturbation theory approximates the full quantum theory at small coupling even when a mathematically rigorous construction of the latter is absent. On the other hand, two-dimensional Yang-Mills theory is a rare example of a gauge theory whose full quantum theory has a rigorous construction. Indeed, the theory can be formulated via a lattice approximation, from which the continuum limit can be described in terms of white noise measures and Brownian motion on Lie groups. It is therefore fundamental to investigate how the the exact answer for 2D Yang-Mills compares with that of the perturbative approach, which a priori are unrelated. In this talk, we discuss recent work on providing a mathematically rigorous formulation of perturbative 2D quantum Yang-Mills, and we consider Wilson loop expectation values in both (Euclidean) light-cone gauge and in Coulomb gauge with respect to a general metric. For light cone gauge, we show that perturbation theory yields exact agreement with the asymptotics obtained from the continuum limit of the lattice to all orders in the coupling constant, thereby confirming the expectation that perturbation theory accurately captures the asymptotics of the full theory. (Received September 12, 2015)